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Smed  
retardant,

the propellant is a fluorocarbon, and

the polyester-polyol is prepared from ethylene glycol.

#### REMARKS

Applicants gratefully acknowledge that many of the prior rejections or concerns have been withdrawn.

Claim 1 as amended corresponds to the allowed Claim 1 of the equivalent European patent application.

Applicants have further amended the claims to reflect the pressure can and composition, for the pending claims in the present invention. These claims have been specifically amended to better explain and describe the present invention.

As to the test report/test results, the examination before the European Patent Office was based on the prior art cited in the international search report. According to the European examiner, the most pertinent prior art was EP 0 480 342 A, its disclosure being close to that of the Pauls ('412) reference. We believe that the test report (see Declaration) can also be applied to the teaching of the Pauls ('412) reference.

The merits of the present invention are related to the finding that the combination of aromatic polyesterpolyols derived from ethylene glycol or glycerol and having a hydroxy number of 100 to 300 have, in combination with certain phosphates and phosphonates, an improved flame resistance, when compared to polyetherpolyols of the same hydroxyl number.

This improvement is surprising and should be patentable.

No new matter has been added to the application.

We now turn to the specific rejections.

#### EXAMINER'S REMARKS

"The request filed on July 26, 2002 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/437,276 is acceptable and a CPA has been established. An action on the filed CPA follows herein."

Applicants assume the Amendment filed March 18, 2002 has now been entered.

Applicants assume that the signed Declaration of the Inventor is entered.

REJECTION OF CLAIM 15 UNDER 35 U.S.C. 112 (1st)

Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner states that:

“Applicants have failed to provide a temperature condition for the claimed viscosity. Since viscosities are temperature dependent, applicants have failed to provide adequate enablement for the claimed viscosity range.”

Applicants respectfully traverse this rejection.

This identified claim has been amended as suggested by the Examiner. Therefore, this rejection had been overcome.

Reconsideration and withdrawal is respectfully requested.

REJECTION OF CLAIM 16 UNDER 35 U.S.C. 112 (2nd)

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner states that:

“The claim is confusing in that it is unclear if it further limits the subject matter of claim 3. Claim 1 already specifies the use of softening phosphates and phosphonates, and claim 2, which claim 3 depends from, already specifies that the propellant is a fluorocarbon. Furthermore, “propellent” has been misspelled.”

Applicants respectfully traverse this rejection.

This claim has been cancelled.

Reconsideration and withdrawal is respectfully requested.

JOINT INVENTORS

The Examiner states that:

“This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).”

Applicants will examine inventorship when claims are allowed and make any appropriate correction.

REJECTION OF CLAIMS 1-3, 6 AND 9-16 UNDER 35 U.S.C. 103 (a)

Claims 1-3, 6 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pauls ('412) in view of Falkenstein et al. ('313) and Friedman ('827).

“Pauls discloses a storage stable polyurethane prepolymer composition, having an NCO content of 5 to 25 percent by weight, derived from aromatic polyisocyanates and polyols, including polyester polyols, which may be dispensed from a pressure can to yield a dimensionally stable foam. See abstract and columns 2-4.

Pauls is silent regarding the use of phosphorous containing compounds as softeners and is further silent regarding the use of phosphorous modified esters (claim 6); however, the use of each of these components within polyurethane foam formulations was known at the time of invention. Falkenstein et al teach at column 3, lines 59-66 that the use of phosphorous containing compounds soften the foam and increase flame resistance. Despite applicant's arguments, the position is taken that urethane containing polyisocyanurates are similar to polyurethanes in terms of chemical composition and properties to the extent that one would have expected that additives useful in one composition would have been useful in the other. Friedman teaches the use of phosphorous containing polyols to provide flame resistance within polyurethanes. Despite applicants' response at page 8, the teachings of Friedman are considered to be relevant to the subject matter of instant claim 6, which is concerned with using phosphorous modified ester reactants in the production of the prepolymer.”

Despite Applicant's argument, the position is ultimately taken that it would have been obvious to utilize known components for their known functions within polyurethane compositions. It has been held that is *prima facie* obvious to utilize a compound for its

known function (In re Linder, 173 USPQ 356; In re Dial et al., 140 USPQ 244); therefore, one of ordinary skill in the art would have been motivated to utilize the known polyurethane foam components with the teachings of the Pauls reference, so as to obtain a pressure can dispensable prepolymer capable of yielding a foam having improved flame resistance, dimensional stability, and softness.

The examiner has considered the declaration, filed July 26, 2002; however, the showings of the declaration are insufficient to remove the prior art rejection. The showings of the declaration are not commensurate in scope with the subject matter of the instant claims. The instant claims are not limited to the use of aromatic polyesters. Furthermore, the polyester used within the examples has a hydroxyl number which exceeds the claimed hydroxyl number range. See page 10 of the specification. Lastly, it is not clear that unexpected results have been demonstrated in view of the teachings of the secondary references concerning flame retardancy.

The disclosure is objected to because of the following informalities: The compound names within the tables of the examples appear to be incomplete. Furthermore, within line 22 of page 10, it appears that Desmophen PU 578 should be Desmophen PU 1578."

Applicants respectfully traverse this rejection.

The Examiner rejected the Claims under U.S.C. 103(a) as being unpatentable over Pauls ('412) in view of Falkenstein et al ('313) and Friedman ('827) citing each reference for its individual teaching and then combining them alleging that a "prima facie" case of obviousness has been made.

Pauls specifically discloses prepolymer compositions based on polyesterols and aromatic polyisocyanates, additionally comprising tris-2-chloroethylphosphate as flame retardant. The propellants used are propane/butane mixture,  $\text{CF}_2\text{Cl}_2/\text{CFCl}_3$  mixtures and  $\text{CHF}_2\text{Cl}$ /butane mixture.

Thus, Pauls is different from the present invention in that he is silent on the combination of aromatic polyisocyanates with specific polyesterols based on aromatic carboxylic acids and ethylene glycol or glycerol, halogen free phosphates or phosphates, and the mixture of propane, butane and dimethylether as blowing agent/propellant.

As is shown in the test reports, polyesterols based on aromatic carboxylic acids and ethylene glycol have superior flame resistance when compared to prepolymers containing

polyetherpolyols. Test report 1 gives a non-specific test comparing polyesterpolyols and polyetherpolyols of different hydroxyl numbers (213 vs. 160). Test report 2 shows in tests 1 to 4 that aromatic polyesterpolyols have lower flammability, when compared to polyetherpolyols of roughly the same hydroxyl number, see samples 7 and 10. The B2 values reach from 110/120 for aromatic polyesterpolyols to 150 for polyetherpolyols. The test reports also show that this is a general behavior, which distinguishes polyesterpolyol based prepolymers from those based on polyetherpolyols.

This finding certainly is surprising. Despite of the fact that phosphorous containing compounds are known as flame retardants, it is everything but obvious that the combination phosphate/aromatic polyester polyol has improved flame retardency over the combination phosphate/polyetherpolyol.

This effect is nowhere disclosed in the related art and could not be expected by the skilled one. It is this effect that caused the European Patent Office to allow the application.

Applicants argue that Pauls ('412) never teaches or suggests the use of phosphorous containing compounds in these halogen-free polyalcohol based aromatic polyurethane polymers and it fails as a primary reference.

Falkenstein discloses polyisocyanurate foams. Starting point is the finding that polyurethane foams containing phosphorous-halogen compounds, such as exemplified by Pauls, have proved to be insufficient in flame resistance, see col. 1, l. 12 to 31. Therefore, the polyurethane backbone of traditional foams was replaced by a polyisocyanurate backbone, which has a higher nitrogen and oxygen content and provides for additional flame resistance. However, polyisocyanurates are prepared by a different catalytic process than polyurethanes and have not been found practical for aerosol applications. Flame resistance is primarily provided by the use of highly halogenated polyols, which teaches away from the present invention. Comparative examples 2 and 3 show that without the halogen containing polyols the foams are readily flammable, even in the presence of additional flame retardants, such as chloroparaffins and

antimony trioxide. There is no teaching or suggestion of the present combination including the aromatic polyesterpolyols.

Moreover, the catalytic formation of polyisocyanates principally excludes such prepolymers from being used from one component cans.

The Examiner is in error concerning Falkenstein ('313). The Falkenstein reference, though concerned with prepolymers, differs significantly from the present invention. The foams produced there are polyisocyanurate foams. Such foams are normally not produced from pressurized cans, but in a commercial plant from tanks by mixing the components in the spray head. Polyisocyanurate foams are based on a trimerization reaction of isocyanate groups using special catalysts, whereas the one-component polyurethane foams of the present invention are based on the reaction of isocyanate groups with water. The prepolymer compositions therefore need different catalysts, and the polymeric foams obtained therefrom have different characteristics and fields of application.

Why would one of skill in the art combine these teachings to produce the present invention? Applicants argue they would not. One reference describes polyurethane and the other describes polyisocyanurate foams. There is no teaching or suggestion in either reference of the existence of the other. The "obvious-to-try" standard is not a proper standard for 35 U.S.C. 103.

Friedman ('827) teaches that his phosphorus containing compounds must have reactive hydroxyl groups which react to incorporate the Phosphorus containing group into the polyurethane matrix. This is unlike Applicant's invention of non-reactive phosphorous containing fire retardant compounds.

Friedman ('827), on the other hand, not only has no relation to foam formation from aerosol cans, but in fact teaches away from the present invention when stating in the passage bridging col. 4/5 that the hydroxyl number of the hydroxy reactions should be very low, preferably at least 35 for a good flexible foam.

The structure of the phosphorous compounds disclosed by Friedman is closely related to polyetherpolyols, in that the polyol component of the phosphorous compound is made from



polyalkylene glycols. Insofar, Friedman also teaches away from the present invention, where the polyol is a polyesterpolyol. The present polyesterpolyols are aromatic and do not contain phosphate groups within the molecule. Phosphates having aromatic polyesterpolyol groups and having a structure similar to the Friedman compounds are principally existent; however, such compounds inevitably would have such high molecular weight that the hydroxyl number would be well below 100, outside the range of the present invention.

Falkenstein '313 and Friedman '827, though being related to foaming technology, have no relation, what so ever, to foam preparation from aerosol cans.

Applicant respectfully urges that the Examiner's position that has made a valid prima facie case of obviousness is in error.

Although the cases cited by Examiner hold that it is prima facie obvious to use a compound for its known function as the examiner has stated in each of In re Hiner, 173USPO356 and in re Dial et al. 140 USPQ244 those references specifically suggested combining the claimed elements.

In Applicant's case there is no such suggestion in any of the cited references that all of the elements of applicants novel combination could be combined.

It has been held in *Custom Accessories Inc. v Jeffrey-Allan Industries, Inc.* 1 U.S.P.Q.2d 1196 (Fed. Cir. 1986) that "casting an invention as 'a combination of old elements' leads improperly to an analysis of the claimed invention by the parts, not by the whole. The critical inquiry is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.

"A traditional problem with focusing on a patent as a combination of old elements is the attendant notion that patentability is undeserving without some 'synergistic' or 'different' effect. Here, the district court spoke of the need for 'a new and useful result.' Such tests for patentability have been soundly rejected by this court. Though synergism is relevant when present, its 'absence has no place in evaluating the evidence on obviousness.' *Custom Accesories inc. v. Jeffrey-Allan industries, inc.*, 1 U.S.P.Q.2d 1196 (Fed. Cir. 1986)."

The Examiner has therefore not made out a prima facie case of obviousness and no comparative data should be required on this record.

In In re Geiger, 2 U.S.P.Q. 2d 1276 (Fed. Cir. 1987) it was held that

“although the fact that each of the three components of the composition used in the claimed method was conventionally employed in the art for treating cooling water systems, to employ these components in combination for their known functions and to optimize the amount of each additive were not regarded as obvious. Obviousness cannot be established by combining the teachings of the prior art to produce a claimed invention, absent some teaching, suggestion or incentive supporting the combination. At best, in view of the prior art, one skilled in the art might find it obvious to try various combinations of these known scale and corrosion prevention agents. This not the standard of 35 U.S.C. §103. *In re Geiger*, 2 U.S.P.Q.2d 1276 (Fed. Cir.1987).”

In this case there is no teaching, suggestion or incentive supporting Examiners combination of the cited prior art.

The Examiner has shown no suggested combination of the cited references other than Applicants own specification. An Examiner’s obvious-to-experiment standard has been held to be acceptable in In re Dow Chemical to 5 U.S.P.Q.2d 1529 Fed. Cir. 1988). That case held that “an obvious-to-experiment standard is not an acceptable alternative for obviousness. Selective hindsight is no more applicable to the design of experiments than it is to the combination of prior-art teachings. There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant’s disclosure. *In re Dow Chemical Co.*, 5 U.S.P.Q.2d 1529 (Fed. Cir. 1988).”

A declaration showing surprising results was submitted in the EP application last year and was effective to allowed a claim 1 substantially the same as the presently amended Claim 1 claiming a mixture of aromatic polyols and aliphatic polyols. These polyols show an unexpected decrease in flammability.

Unfortunately, the primary technical inventor Mr. Schumacher is ill and now has limited capabilities.

A similar Declaration was filed earlier in this case.



SUMMARY

Based on the above amendments and arguments, Applicants argue that the present claims are of a form and a scope for allowance. Prompt notification thereof is respectfully requested.

Applicant has amended the claims to overcome the §112 rejections and has shown that Examiner has failed to make out a prima facie case of obviousness under §35 U.S.C. 103.

Therefore Applicant respectfully requests that these rejections be withdrawn and that in view with the terminal disclaimer filed in the parent application that this case is in condition for allowance.

APPLICANTS WILL CONSIDER ANY EXAMINER'S AMENDMENTS OR REQUESTS FOR DOCUMENTS WHICH WILL ADVANCE THIS APPLICATION TO ISSUE.

The Examiner is requested to call the undersigned at (650) 324-1677 x 3 with any comments or questions.

Respectfully submitted,



Date: January 16, 2003

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Enclosure:

Substitute clean pages for amendments to the claims

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IN THE CLAIMS: MARKED-UP Claims 1 - 3, 4, and 9 - 16 are pending.

1. (Four Times Amended) A prepolymer composition for producing polyurethane insulating foams with fire-retardant properties from aerosol cans [pressure tanks], wherein said prepolymer composition comprises:

a prepolymer component having at least one polyurethane (PU) prepolymer with a content of NCO groups of 4 to 20 wt%

said prepolymer being prepared from aromatic polyisocyanates and

polyester-polyols prepared from polycarboxylic acid and ethylene glycol or glycerol, said polyester polyols having a hydroxyl number between about 100 and [200,] 300 and a functionality of 2 to 4 and

a propellant component selected from the group consisting of propane, butane, and dimethyl ether, and combinations thereof,

wherein said prepolymer component is halogen-free and has a content of 5 to 40 wt%, of softening phosphates, phosphonates or combinations thereof having the formulae  $O=P(OR)_3$  and  $O=P(OR)_2R$ , wherein R is the same or different and selected from alkyl, aryl, or alkylaryl groups having up to 10 carbon atoms, based on the prepolymer content.

6. (Four Times Amended) The prepolymer composition of claim 1 wherein the polyester polyols are at least partly phosphorous-modified, and the polyester-polyol is prepared from ethylene glycol.

10. (Three Times Amended) The prepolymer composition of claim 1, wherein the propellant component is selected from the group consisting of [comprises] propane and butane [, dimethylether or mixtures thereof.] , and the polyester-polyol is prepared from ethylene glycol.

15. (Four Times Amended) The prepolymer composition of claim, 1 wherein the initial service viscosity of the polyurethane prepolymer is between 8000 to 15000 mPa.s. at 20°C.

16. (Three Times Amended) The prepolymer composition of claim 3 wherein softening phosphates and phosphonates are used for setting polyurethane insulating foams to be flame-retardant, [and]

the propellant is a fluorocarbon, and

the polyester-polyol is prepared from ethylene glycol.